1995 JANNAF PROPULSION AND SUBCOMMITTEE JOINT MEETING
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METEOROLOGICAL FORECASTING FOR EMERGENCY PREPAREDNESS AND RESPONSE AT THE KENNEDY SPACE CENTER AREA OF FLORIDA

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The Atmospheric Release Advisory Capability (ARAC) system at Livermore has been used both nationally and internationally for responses to accidents involving a variety of health-related airborne pollutants. The system employs a suite of diagnostic models to generate wind fields for the Lagrangian particle dispersion model ADPIC. Although diagnostic models require minimal time to execute, the resulting wind fields are frequently sensitive to the quality and quantity of wind observations in the area of interest. In order to overcome this deficiency, we are developing the next generation of the ARAC emergency response system (ARAC III) that incorporates a prognostic capability to forecast meteorological fields. The new ARAC III system will employ advanced, high-performance, computer platforms to generate diagnostic and prognostic flow fields. With this advanced system we will be able to respond to releases involving heavier-than-air as well as other chemical/toxic gases and a broad spectrum of nuclear accidents.

The ARAC III system will use the Navy limited area model NORAPS as the base forecast model. NORAPS is a primitive equation model in sigma coordinates with options for triple nesting in the horizontal. The physics in the model include a planetary boundary layer formulation, large scale precipitation, dry convective adjustment and a modified Kuo cumulus convection parameterization scheme. Initial and boundary conditions for NORAPS are obtained from NOGAPS, the Navy's global prediction model. We plan to deploy NORAPS as an operational forecast model to provide short range 6 to 36 hour meteorological forecasts with high spatial resolution. The prognosed wind field will be used as input for a new dispersion model which we are currently developing.

One of the first operational applications of this modeling system is to provide emergency response support, as part of the DOE assistance, for the Cassini launch in the Fall of 1997 at the Kennedy Space Center. Studies have shown that the Cape Canaveral/KSC coastal flow pattern can be significantly impacted by small-scale geographic features such as an irregular coastline, inland rivers and lagoons. The complex flow patterns caused by the interaction of different scale circulations create a special concern for those operations where the atmospheric diffusion of accidental releases must be considered. In this paper we report on our study to simulate the mesoscale flow over the Cape Canaveral area with NORAPS. Nested grids are invoked to capture the finer scale features that are associated with geographical irregularities. The results are compared with observations from the Kennedy Space Center Boundary Layer Experiment (KABLE), an experimental program conducted in 1988 to document the atmospheric boundary layer structure at the Kennedy Space Center.

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